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HI-TECH HYDRAULICS

DETAIL CATALOGUE

## A2F

Fixed Displacement Pump/Motor  
For Open & Closed circuit  
Size 10 to 500 ml/r  
Maximum pressure : 400 bar



## Introduction

Axial piston unit of bent axis design with fixed displacement for use either pump or motor in hydrostatic drivers, in open or closed circuit. If operated as a pump, the flow is proportional to the drive speed and displacement.

If operated as a motor, the output speed is proportional to the swept volume and inversely proportional to displacement. The output torque increases with the pressure drop between the high and low pressure sides.

## Features

- High performance rotary group with well-proven spherical control area with the advantages: self-centring low peripheral speed, high efficiency.
- Robust rolling bearings endure long service life.
- Drive shaft capable of adopting radial loading.
- ISO mounting flange, uniform for fixed displacement pumps/motors and variable motors from size 55
- May be used in conjunction with fire-resistant fluids
- Low Noises generation.

## Ordering code

Fixed Displacement Pump/Motor = A2F

Displacement (ml/r)	=	
9.4	=	10
11.6	=	12
22.7	=	23
28.1	=	28
44.3	=	45
54.8	=	55
63.0	=	63
80.0	=	80
107	=	107
125	=	125
160	=	160
200	=	200
250	=	250
355	=	355
500	=	500



Port Plate  
1,2,3,4  
(Below Table)







Shaft end  
P = Keyed shaft (GB 1096-79)  
Z = Splined shaft DIN 5480  
S = Splined shaft GB 3478.1-83

Series  
1,2,3,4,5  
(Below table)

Direction of rotation (view from shaft end)  
R = Clockwise  
L = Anti-clockwise  
W = Alternating  
(Not for pumps in open circuit)

Series	4	2/3	1/2	1/2	2	1/2	2	5							
size	10	12	23	28	45	55	63	80	107	125	160	200	250	355	500
Port plate 1	1	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	2														
	3														
	4	•	•	•	•										

Port plate 1

Size	10-160	200-500
Pump operation in closed circuit and motor operation	1. metric threads 	1. Flange 
	2. SAE Flange 	
Pump operation in open circuit	3. Flange 	1. Flange 
	4. metric threads 	



### A2FO

Fixed Displacement Bent Axis piston pump  
Size 10 to 180 cc  
Nominal pressure: 400 bar  
Maximum pressure: 450 bar



### Features

- Fixed displacement pump A2FO of axial piston, bent axis design is made suitable for hydrostatic drives in open circuits.
- Suitable for use in mobile or industrial applications.
- Output flow is proportional to drive speed and displacement.
- The drive sharp bearings are designed to give the service life expected in these areas of operation.
- Careful selection of the displacements offered, permit sizes to be matched to practically every application.
- Favorable power/weight ratio.
- Compact and economical design.
- Optimum efficiency.
- One piece positions with piston rings.

### Specifications

Size				10	12	16	23	28	32	45	56
Displacement		$V_g$	cm <sup>3</sup>	10.3	12.0	16.0	22.9	28.1	32	45.6	56.1
Max. speed		$n_{max\ 1)}$	rpm	3150	3150	3150	2500	2500	2500	2240	2000
Max. perm. speed with increased input pressure $P_{abs}$		$n_{max,perm. 2)}$	rpm	6000	6000	6000	4750	4750	4750	4250	3750
Max. perm. output flow at $n_{max}$		$Q_{vmax}$	l/min	32.4	37.8	50	57	70	80	102	112
Max. power at $Q_{vmax}$	$\Delta p = 350$ bar	$P_{max}$	KW	18.9	22	29.2	33	41	47	59.5	65
	$\Delta p = 400$ bar	$P_{max}$	KW	21.6	25	34	38	47	53	68	75
Perm. torque	$\Delta p = 350$ bar	T	Nm	57	67	88	126	156	178	254	312
	$\Delta p = 400$ bar	T	Nm	65	76	101	145	178	203	290	356
Case volume			L	0.17	0.17	0.17	0.20	0.20	0.20	0.33	0.45
Weight (approx.)			kg	6	6	6	9.5	9.5	9.5	13.5	18

Size				63	80	90	107	125	160	180
Displacement		$V_g$	cm <sup>3</sup>	63	80.4	90	106.7	125	160.4	180
Max. speed		$n_{max\ 1)}$	rpm	2000	1800	1800	1600	1600	1450	1450
Max. perm. speed with increased input pressure $P_{abs}$		$n_{max,perm. 2)}$	rpm	3750	3350	3350	3000	3000	2650	2650
Max. perm. output flow at $n_{max}$		$Q_{vmax}$	l/min	126	144	162	170	200	232	261
Max. power at $Q_{vmax}$	$\Delta p = 350$ bar	$P_{max}$	kW	73.5	84	95	100	117	135	152
	$\Delta p = 400$ bar	$P_{max}$	KW	84	96	108	114	133	155	174
Perm. torque	$\Delta p = 350$ bar	T	Nm	350	445	501	594	696	893	1003
	$\Delta p = 400$ bar	T	Nm	400	511	572	678	795	1020	1145
Case volume			L	0.45	0.55	0.55	0.8	0.8	1.1	1.1
Weight (approx.)			kg	18	23	23	32	32	45	45

1) the values shown are valid for an absolute pressure ( $P_{abs}$ ) of 1 bar at the suction inlet S and when operated on mineral oil (with a specific mass of 0.88kg/L).

2) by increase of the input pressure ( $P_{abs} > 1$  bar) the rotational speeds can be increased to the max. admissible speeds  $n_{max}$  limit (speed limits)

#### Determining the size:

$$\text{Flow } q_v = \frac{V_g \times n \times \eta_v}{1000} \quad [ \text{L/min} ]$$

$$\text{Torque } T = \frac{V_g \times \Delta P}{20\pi \times \eta_{mh}} \quad [ \text{Nm} ]$$

$$\text{Power } P = \frac{2\pi \times T \times n}{60000} = \frac{q_v \times \Delta P}{600 \times \eta_i} \quad [ \text{KW} ]$$

$V_g$  = Displacement per revolution in mL/r

$\Delta P$  = Differential pressure in bar

$n$  = Speed in rpm

$\eta_v$  = Volumetric efficiency

$\eta_{mh}$  = Mechanical-hydraulic efficiency

$\eta_i$  = Overall efficiency

**Ordering code**

Axial piston unit Bent axis design, fixed displacement for use with mineral oil	= A2F																																	
Mode of operations Pump, Open circuit	= 0																																	
Size (Displacement V mL/rg <sup>3</sup> ) 10, 12, 16, 23, 28, 32, 45, 56, 63, 80, 90, 107, 125, 160, 180																																		
Series	= 6																																	
Index	= 1																																	
Direction of rotation(View on shaft end) Clockwise Anti-Clockwise	= R = L																																	
Seals NBR (nitril- caoutchouc) FKM (fluor- caoutchouc)	= P = V																																	
Shaft end		10 12 16 23 28 32 45 56 63 80 90 107 125 160 180																																
Splined shaft DIN 5480	<table border="1" style="font-size: 8px;"> <tr><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>-</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>A</td></tr> <tr><td>●</td><td>●</td><td>-</td><td>●</td><td>●</td><td>-</td><td>●</td><td>●</td><td>-</td><td>●</td><td>-</td><td>●</td><td>-</td><td>●</td><td>-</td><td>Z</td></tr> </table>	●	●	●	●	●	●	-	●	●	●	●	●	●	●	●	A	●	●	-	●	●	-	●	●	-	●	-	●	-	●	-	Z	
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Parallel shaft with key, DIN 6885	<table border="1" style="font-size: 8px;"> <tr><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>-</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>B</td></tr> <tr><td>●</td><td>●</td><td>-</td><td>●</td><td>●</td><td>-</td><td>●</td><td>●</td><td>-</td><td>●</td><td>-</td><td>●</td><td>-</td><td>●</td><td>-</td><td>P</td></tr> </table>	●	●	●	●	●	●	-	●	●	●	●	●	●	●	●	B	●	●	-	●	●	-	●	●	-	●	-	●	-	●	-	P	
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Flange mounting		10 12 16 23 28 32 45 56 63 80 90 107 125 160 180																																
ISO 4-hole	<table border="1" style="font-size: 8px;"> <tr><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>B</td></tr> </table>	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	B																	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	B																			
Service line connections 1)		10 12 16 23 28 32 45 56 63 80 90 107 125 160 180																																
A(B) SAE, at side S SAE, at rear	<table border="1" style="font-size: 8px;"> <tr><td>-</td><td>-</td><td>-</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td><td>05</td></tr> </table>	-	-	-	●	●	●	●	●	●	●	●	●	●	●	●	05																	
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A (B) threads at side S threads, at rear	<table border="1" style="font-size: 8px;"> <tr><td>●</td><td>●</td><td>●</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>06</td></tr> </table>	●	●	●	-	-	-	-	-	-	-	-	-	-	-	-	06																	
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= preferred type  
 = available  
 - = not available

1) fastening threads resp.threaded ports are metric



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